CLAIMS

1. A method for producing a porous ceramic structure, comprising: a mixing and kneading step of mixing and kneading a clay material containing raw material particles and a pore-forming agent together with a dispersion medium to obtain a clay; a forming and drying step of forming the clay to obtain a formed ceramic body, and drying the formed ceramic body to obtain a dried ceramic body; and a firing step of firing the dried ceramic body to thereby obtain the porous ceramic structure,

wherein as the pore-forming agent, hollow particles (microcapsules) made of an organic resin are used, and as at least one type of the raw material particles, particles are used which contain 30 to 100 mass% of particles (spherical particles) having a circularity of 0.70 to 1.00 with respect to the total mass of the raw material particles.

2. The method for producing the porous ceramic structure according to claim 1, wherein the spherical particles have a circularity of 0.80 to 1.00.

3. The method for producing the porous ceramic structure according to claim 1 or 2, wherein the clay is formed into a honeycomb shape in which a large number of cells are defined and formed by partition walls.

4. The method for producing the porous ceramic structure according to any one of claims 1 to 3, wherein the spherical particles are obtained by heating ceramic particles at a temperature in a range of a melting point (Tm) of a ceramic to Tm + 300°C.

5. The method for producing the porous ceramic structure according to any one of claims 1 to 3, wherein the spherical particles are obtained by crushing the ceramic particles with a jet air current.

6. The method for producing the porous ceramic structure according to any one of claims 1 to 5, wherein as the raw material particles, there are used cordierite ($2MgO \bullet 2Al_2O_3 \bullet 5SiO_2$) forming material particles composed of silica (SiO_2) particles, kaolin ($Al_2O_3 \bullet 2SiO_2 \bullet 2H_2O$) particles, alumina ($Al_2O_3$) particles, aluminum hydroxide ($Al(OH)_3$) particles and talc ($3MgO \bullet 4SiO_2 \bullet H_2O$) particles, and as at least one type of the silica (SiO_2) particles, the alumina (Al_2O_3) particles and the aluminum hydroxide ($Al(OH)_3$) particles, there are used particles which contain 30 to 100 mass% of the spherical particles with respect to the total mass of the particles.

7. The method for producing the porous ceramic structure according to claim 6, wherein the spherical particles are obtained by heating the silica (SiO_2)

particles in flame at a temperature in a range of 1730 to 2030°C.

8. The method for producing the porous ceramic structure according to claim 6 or 7, wherein the spherical particles are the silica (SiO_2) particles having an average particle diameter of 5 to 50 μm.

9. The method for producing the porous ceramic structure according to any one of claims 1 to 8, wherein the mixing and kneading step mixes and kneads the mixed material together with the dispersion medium at a reduced pressure of -40000 Pa to -93000 Pa to thereby obtain the clay.

10. A porous ceramic structure obtained by: forming a clay obtained by mixing and kneading, together with a dispersion medium, a clay material containing silica (SiO_2) particles, kaolin ($Al_2O_3 \bullet 2SiO_2 \bullet 2H_2O$) particles, alumina ($Al_2O_3$) particles, aluminum hydroxide ($Al(OH)_3$) particles, talc ($3MgO \bullet 4SiO_2 \bullet H_2O$) particles and a pore-forming agent; drying the clay; and firing the clay, the porous ceramic structure containing cordierite ($2MgO \bullet 2Al_2O_3 \bullet 5SiO_2$) as a main constituting component and having a porosity of 60 to 72% and an average pore diameter of 15 to 32 μm,

wherein as the pore-forming agent, hollow particles (microcapsules) made of an organic resin are used, and as

at least one type of the silica (SiO_2) particles, the alumina (Al_2O_3) particles and the aluminum hydroxide ($Al(OH)_3$) particles, particles are used which contain 30 to 100 mass% of particles (spherical particles) having a circularity of 0.70 to 1.00 with respect to the total mass of the particles.

11. The porous ceramic structure according to claim 10, having a honeycomb shape in which a large number of cells are defined and formed by porous partition walls.

12. The porous ceramic structure according to claim 11, further comprising:

plug portions which alternately plug one opening of the large number of cells and the other opening thereof.